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Published in:

Realising Ambitions: Proceedings of the 6th Annual Symposium of the United Kingdom & Ireland Engineering Education Research Network

Publication date:

2019

Document Version

Publisher's PDF, also known as Version of record

[Link to publication in ResearchOnline](#)

Citation for published version (Harvard):

Munoz de Escalona, P, Cassier de Crespo, Z, Olivares, M, Dunn, M, Graham, C & Hamilton, L 2019, Using collaborative online international learning as an approach to promote curricula internationalization in engineering. in M Malik (ed.), *Realising Ambitions: Proceedings of the 6th Annual Symposium of the United Kingdom & Ireland Engineering Education Research Network*. vol. 9781861376695, University of Portsmouth, pp. 129-138.

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Paper 2: Using Collaborative Online International Learning as an Approach to Promote Curricula Internationalization in Engineering

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KEY WORDS: students, engineering, collaborative, cooperative, internationalization

ABSTRACT

A Collaborative Online International Learning (COIL) learning activity was carried out for undergraduate students in mechanical engineering in three different Universities, Scotland (Host institution), Spain and Venezuela, in order to give students, the opportunity to prepare themselves for a global society

BACKGROUND / CONTEXT

As academics it is important to prepare our students for a global society, where social, cultural and economic roles play an important aspect; where the value of internationalizing our curricula will provide students with international and intercultural skills. Online collaboration is one approach to internationalising the curriculum (Green, 2015), an important aspect in promoting intercultural competencies, international perspectives and ethical sensitivities, which may contribute to the enhancement of students' capability to develop as responsible global citizens (Leask, 2015). By incorporating e-learning activities in our teaching we also provide students with the opportunity to interact and engage with peers in cooperative and collaborative learning (Bach et al. 2017), helping preparing them

for a digital future as well. Online discussion forums and wikis are used for collaborative and cooperative learning and have been widely used to promote student's engagement (Cole, 2009 and Muñoz-Escalona, 2017, Muñoz-Escalona, 2018).

International facts and Figures provided by Higher Education (HEA, 2017) show that the UK is the second most popular destination in the world for international students (12.5%). The United States is the most popular with 24.6% and Australia the third most popular with 7.8%, Despite numbers have increased in 3% for the UK since 2014 the figure is still low. High investment and efforts have been conducted for Internationalization of the Curricula where approaches such as distance learning, blended learning, Massive Online Open Courseware (MOOCS), can be mentioned, however research still shows that around 80% of European students will not be able or willing to study abroad (Green, 2015), while 78% of undergraduate students recognise that studying with international peers prepares them to become global citizens (HEA, 2017).

LITERATURE REVIEW / RATIONALE

In 2009, Leask cited the internationalisation of the curriculum (IoC) as *"the incorporation of an international and intercultural dimension into the content of the curriculum as well as the teaching and learning processes and support services of a program of study"*. Thus, the curriculum itself is viewed as the vehicle through which students can obtain an international experience through their curricula, for their development of intercultural competencies and capabilities during their studies. Moreover, as the Higher Education Academy (HEA) suggest, an internationalised curriculum should prepare students to be able to effectively *"contribute responsibly to a globally interconnected society"* in addition to providing *"high quality, equitable and global learning experience for all students studying UK HE programmes, irrespective of their geographical location or background"* (HEA, 2014).

An internationalised curriculum is one that help students develop *"graduate capabilities, global citizenship and intercultural competency"* (Leask, 2015). As academics we must try to ensure that our students gain the confidence and capabilities to function effectively in a 'supercomplex' globalised, market society (Barnett, 2004). In 2005, Robson suggested that academics establish international and intercultural learning outcomes in aiming to influence students learning in this area, which is also reinforced by teaching and relevant methods of assessment.

Therefore, IoC is not solely about the generation and inclusion of extra content in the curriculum, it is more concerned with the greater alignment of learning outcomes and possible use of Internationalised Learning Outcomes (Beelen and Jones, 2015) in recording what, when and how students develop in regard to graduate attributes, intercultural competency and global citizenship in their programme of study.

The low uptake of physical, outward bound international exchanges by students in the UK (15, 610 in 2013/14) and more markedly in Scotland (2,107 in 2013/14) versus nearly double the number of incoming students on Erasmus exchanges (European Commission, 2015) provides a clear rationale for considering alternative means to facilitate international experiences for students and viewing the curriculum as a focal point for these. Collaborative Online International Learning (COIL) provides a way to engage students in a near replicable experience to their peers that undertake an Erasmus exchange.

Furthermore, COIL is viewed *“as a means to internationalize curricula, build global partnerships, and help prepare globally competent students who are equipped for work and civic engagement in a global context”* (State University New York, n.d.).

COIL projects involve collaboration between two or more groups of students and staff where academics develop a shared syllabus in a subject-area, discipline or topic which relates to existing curriculum and intended learning outcomes, or newly-devised project specific curricula and learning outcomes. Projects normally consist of two or more partner institutions from who approach the project from different cultural and geographic backgrounds and perspectives. Utilising online technologies for teaching and learning - e.g. WebEx, e-mail, Wikis, Virtual Learning Environments (VLEs), Facebook etc. – in either synchronous or asynchronous exchanges, COIL brings a live, global dimension to course context through cross-cultural dialogue and teamwork. As a form of virtual mobility and international exchange between students and staff, COIL can help students develop intercultural communication and other related capabilities, particularly with its emphasis on experiential and collaborative student-centred learning. As a result, COIL offers new, alternative lenses for students and staff to view their own culture, subject area and professional practice, which enhances student’s digital literacies and ability to work collaborative as part of a group in real-life setting, further promotes their employability beyond graduation.

Whilst undoubtedly not as rich or as intense an experience as a physical international experience living and studying in another country and culture, COIL provides an accessible,

cost-effective intercultural experience which complements and supports related aspects of students' development during degree study, e.g. team work, empathy, collaboration, communication etc., and is available to all students.

The purpose of this research is to give students the opportunity to work with international peers, exchange knowledge in the area, increase communication skills, experience different culture and innovating and enhancing their practice through the effective use of digital and collaborative technologies - allowing them and invited academics to potentially establish their own COIL projects as a result.

AIM AND OBJECTIVES / RESEARCH QUESTION(S)

This study aimed to:

- Promote and encourage intercultural competences, international; perspectives and ethical sensitivities among students to become responsible global citizens.
- Encourage and enhance knowledge exchange, communication skills and teamwork.
- Promote global manufacturing awareness in engineering students.

METHODOLOGICAL APPROACH

A COIL activity was conducted in three different institutions for 2nd/3rd year of undergraduate engineering degree taking materials and manufacture subject or equivalent. Table 1 show Countries involved and number of participants.

For the activity a “car dissection” was selected, where different aspects were analysed and discussed:

- i) Functionality of the car component selected for study
- ii) Physic involved
- iii) Materials (Analysis of microstructure)
- iv) Manufacturing process

Table 1. Countries involved and number of participants

Country-University	Degree	Male	Female	Total
Scotland (Leading institution)	2 nd year Mechanical engineering	43 (1 international, 1 Erasmus)	3 (2 Erasmus)	46
Spain	Industrial Design Engineering and Product Development degree	5	6	11
Venezuela	3 rd year Mechanical Engineering	16	9	25

The activity took place over a period of 3 weeks which included e-learning tools to develop, communication, collaborative, cooperative and teamwork skills. The activity was divided in four main stages:

- i) Introduction with their peers (social forum)
- ii) Asynchronous online discussion forums (ADF) to discuss and analyse the selected component
- iii) Wiki to upload and edit the important findings (registered in the discussion forum)
- iv) Development of an A3 poster to communicate and share their findings with other class mates

ADF was selected due to its effectiveness, as they can be access anytime (different time zone) and all posts are registered (Ellis, 2008)

The wiki was used as a tool to develop a poster as the final outcome of the major findings of each groups' discussion (Ramanau, 2009, Cole, 2009 and Lai 2011))

Students were divided in groups of 7-9 students based on three aspects.

- i) At least one student from each participating institution in each group (this aspect restricted the amount of groups to 11 as there were only 11 students from the Spanish institution).

- ii) Students level of English (only restricted to students from Spain and Venezuela)
- iii) At least one female student per group, for equality and diversity purposes.

Moodle was selected as the Virtual Learning Environment as this was the platform used by the Scottish hosting institution.

It must be highlighted that 90% of the participants had no experience using online discussion forums and/or wiki as e-learning tools. Spanish students were familiar to Moodle, as it was the VLE used in their institution; however Venezuelan students were not familiar with this VLE.

Once the activity was concluded a questionnaire (survey) was distributed to all participants in order to collect information regarding students' experience. For a deeper analysis a one-hour focus group was conducted at each university with 10-12 volunteers. The questions asked in the focus group followed the Model AIDA (Awareness, Interest, Desire, Action). A qualitative approach was used to analyse the results from the survey and the focus group.

KEY FINDINGS

- The majority of the students described the activity as different, interesting, innovative, unique, challenging and motivating.
- Students from Spain and Venezuela felt that their confidence increased 40% and their communication skills 60%.
- Overall all students felt that the activity increased their confidence communicating with other cultures in 85% and 70% have a better understanding of a different culture and country.
- 65% of the students have increased their likeability to travel.
- 70% of the groups were led by the Venezuelan students.

DISCUSSION

A social forum was provided for the students to virtually meet their groupmates. It was observed that students from Spain and Venezuela took the initiative to start the conversation and comment about their hobbies, preferences, etc. and students from Scotland took more time to post (initial observers). When analysing the data, it was thought that this behaviour was probably due to the fact that students from Spain and Venezuela

were in their 3rd year of studies compared to students from Scotland which were in their 2nd year, however when analysing the data (25% of students from Scottish institution were mature students with ages between 25-40).

73% of the students responded that now they feel more comfortable and capable of finding jobs abroad as the activity was used as a benchmark and they were able to compare and share their knowledge with international peers. Students also realised that by interacting with international peers they were having a taste in global manufacturing; i.e.

“Great experience as we had to work with students from different countries, just like in real life as in the future most of the companies will be global and we will need to work with colleagues from around the world in a project”.

Some students also realised that despite all students were undertaking an engineering degree there were differences in communication styles as steels were named differently (code/Standards); i.e.

“I felt confused with the name my international peer was giving to the steel we were analysing. I thought it was because of English barrier but then I realised he was right, and he was just using an American Standard and I was using European Standard”.

In general, the activity was found to be challenging and time consuming, however very rewarding. Overall 93% of the students were satisfied with the whole experience. Students enjoyed the activity and they felt their level of knowledge and understanding of the topic has increased. 90% of the students enjoyed interacting and working with students from other institutions or from abroad

83% of the students will recommend the activity to other academics. This difference of 10 points between satisfaction (93%) and recommendation (83%) was basically due to the fact that students recognize that the activity was challenging and time consuming and sometimes difficult to interact daily due to commitments with other subjects.

As all activities the weakness point was addressed to long periods of lack of interaction or participation of some of the students.

The long periods of lack of communication were due to

- students not subscribing to automatic notifications from the forums,
- Different time zones
- Commitments with other modules
- lack of knowledge in use of e-learning tools and the use of Moodle as VLE platform.

Despite all efforts it was very difficult to arrange a suitable time to satisfy all students from the three institutions to conduct the activity,

CONCLUSIONS & RECOMMENDATIONS

- Collaborative Online International Learning has proved to be an excellent and engaging educational approach to be used for internationalizing the curricula.
- Students participating in the COIL activity recognize the value and the importance to interact with international peers in order to get ready for a global environment.
- Academics involved
- Students have seen the activity as an opportunity to enhance their CV by undertaken an international collaborative activity for their first time.
- 90% of the students felt they have benefit from the activity as they were able to enhance their communication skills, team workability and experience interaction with international peers.
- 83% of the students will recommend the activity, however it was perceived as very challenging and time consuming.
- Despite it is recognised that COIL will not substitute the experience of living abroad, it can provide a taste and mind opener to think in future international opportunities
- It is recommended to upload a video on how to use the different e-learning tools and VLE platform rather than provide them with documents to decrease student's anxiety towards the use and application of e-learning tools

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